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BATH WATERS,
A
CONJECTURAL IDEA
OF THEIR
NATURE and QUALITIES,
In THREE LETTERS,

To ———

TO WHICH IS ADDED,
PUTRIDITY and INFECTION
Unjustly imputed to **FEVERS,**

*A cruel Public Grievance, attempted to be redressed; with some
Account of the Nature and Management of plain Fevers.*

Andrew Wilson
By **A. W. M. D.**
Reg. Colleg. Med. Edinb. Soc.

BATH:
Printed and Sold by **S. HAZARD;**
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and **STRAHAN, LONDON.**

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L.DCC.LXXXVIII,

BATH WATERS

CONJECTURAL IDEAS

NATURE and QUALITIES

OF THE

PURITY and INFECTIOUS

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To Henry Harrington, M. D.

S I R,

*I HOPE you will pardon the liberty,
which, without asking your per-
mission, I have taken of inscribing this
small publication to you ; as an expres-
sion of the sincere regard and esteem
with which I am, sir,*

Your most humble servant,

ANDREW WILSON.

BATH.

D. M. McLaughlin

[Faint, illegible text]

which, without doing any harm,

... I have been of interest to

THE UNIVERSITY OF CHICAGO

Part of the present report and others

1940

1990

1947

A

CONJECTURAL IDEA, &c.

L E T T E R I.

S I R,

IN obedience to your request, without any preliminary apology of insufficiency for the undertaking, I sit down to communicate to you the best idea I can of the nature and qualities of the Bath waters.

You might very probably have applied to some abler person for this piece of information, but to none more willing and bound to obey you. If in my solicitude

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to

to oblige you in this point, I am betrayed into any precipitance of judgment on the subject, I would not wish for more indulgence of such mistakes from any one, than I am confident I shall find from you.

When you apply to me for this information, I presume it is not because you are ignorant, that many learned and skilful investigations have been made into the principles of the Bath waters, by persons who were themselves not only abundantly qualified for the undertaking, but who have been successive aids and guides to one another in the execution of it; therefore I conclude that your request neither implies that I should renew their labours, nor that I should entertain you with a detail of all that they have written on the subject; but merely that I should communicate to you my conceptions of the specific nature and qualities of a medicine in such general use,
and

and this I will do with all the openness and plainness I can.

As you never was upon the spot, it may not be improper to inform you, that there are three hot medicinal springs in Bath; all of them adjacent to, two of them close by, one another. Each spring is inclosed by commodious buildings, comprehending both baths, and pump-rooms for drinking the waters. They are situated in the low or old City of Bath, which stands in a valley not much elevated above the level of the river Avon; but in securing and cleansing the veins of some of these hot springs their sources, I believe, have been traced deeper below its bed than they break out above it, without any signs of having reached the greatest depth of the springs.

The hills that surround the city and its adjacent plains on every side, though not very lofty, are pretty close upon one another and steep, and they abound every

where with cold springs flowing from their declivities : so that the hot springs seem to derive their waters from some deeper subteranean supplies and veins than those which flow more superficially from the sides of the hills.

The quantity of water collectively issued from all the hot springs is very considerable, but at the same time individually they, in respect of the proportions discharged, differ remarkably from one another. The king's bath, the pump-room of which is twice in the day the general rendezvous of the company that resort to Bath for the benefit of the waters, discharges above half a ton of water every minute ; that is, not less than eight hundred and fifty six tons in twenty-four hours, while the hot bath exceeds little more than an eighth part of that quantity, and the cross bath somewhat less than one tenth in the same time. These quantities, it is said, are in no degree

degree affected nor altered by the heat or cold, moisture or drought of the atmosphere, but continue the same in all seasons. This I apprehend gives another presumption in proof of the great depth of the bed of these springs.

The same invariableness is said to hold as to the different degrees of the heat of the different springs; though that cannot have always been the case, if it is true that the spring denominated the hot bath or spring obtained that epithet from its being formerly reputed the hottest of the three.*

The materials separable by evaporation or otherwise from the different springs are much the same in quality and nearly so in quantity also. On account

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* According to Dr. Falconer's account of the heat of the different springs, which I dare say may be depended upon, that of the king's bath and of the hot bath is 116 degrees, that of the cross bath 112 degrees.

of these materials all the three waters are somewhat heavier than common soft water. The general quantity of these ingredients separable from the waters by evaporation, is said to be in the proportion of about between two drachms (quarter of an ounce) and two drachms and a half in the gallon.*

* That is not a scruple or twenty grains in the pint of water, a very small proportion indeed, when we consider that more than half that is absorbent earth. Few springs accounted medical yield a smaller proportion of analysable ingredients.—Some examiners of these waters have computed the analysable ingredients contained in them, not to amount to one three hundredth part of the whole. If they had said to one five hundredth part, I believe they would have been nearer the mark. However small this proportion may seem, yet it amounts to an immense quantity of solid parts washed from their subterraneous bed in the course of one year: for though we should admit the solid contents of the waters to amount only to an eight hundred and fiftieth part of the whole, (which is short of the number of tons which the springs are calculated to discharge in twenty-four hours) this would bring the discharge of solid parts to three hundred and sixty-five tons in the course of one year. What a prodigious excavation would this make in the course of two thousand years, if the waste is not by some means from time to time repaired.

Of these ingredients considerably more than one half is calcareous earth of limestone, chalk, or shells, (perhaps some marle) that is such earth as combines with acids and destroys their acidity by forming with them a neutral salt. Hence the waters may be deemed gentle correctors of acidity in the stomach; but not so in any powerful degree.

The other ingredients contained in the waters are, neutral salts of different kinds, such as sea salt, glauber's salt, calcareous nitre, and selenites; but the quantity of all these in gross, is so insignificant, that considered complexly (for all neutral salts have in common a cooling attenuating quality, and are laxative in large doses) they can scarcely be said to have any sensible effect as alteratives upon the constitution; however as such we shall suppose them to have some imperceptible effects; for as to the waters sometimes proving laxative, that can be only

accidental, owing to peculiarity of constitution, such as laxity, irritability, or sometimes to foulness or disorders of the bowels.

Besides the above ingredients, the waters when warm are, though very slightly indeed, impregnated with a particular species of ferrugineous vitriol, in such small proportion as not to exceed, according to the calculation of some nice examiners, $\frac{1}{10}$ or $\frac{1}{15}$ part of a grain in the pint of water. Now though the subtilty and activity of this vitriol, being formed with the volatile aerial acid called fixed air, may in some measure compensate for the seemingly insignificant quantity of it, and render it not altogether without some good effect, where vitriolic influence is required; yet I can scarcely think its effect is such as to render the waters unsafe even in the deepest pulmonary consumption or hectic state, if there
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is nothing else in the waters to forbid the use of them in such habits.*

I called it a particular species of vitriol, to distinguish it from such as is formed with the vitriolic acid, which is stronger and more fixed. The combination between this volatile acid and the ferruginous particles is so flight and weak that it deserts its basis, and flies off of its own accord, as the water cools when exposed to the air. Neither is there any sign of the water's containing any more of this acid, than while it remains in them, is in a combined state either with the

* I am verily inclined to think, that any of the Bath waters drunk as cool as the Bristol is naturally, would be as medical, nay, perhaps more so in pulmonary and hectic cases, than the Bristol water is. From its analysable ingredients there is no reason to suppose the contrary, and from its unanalysable qualities, (of which in my third letter) I think the presumption most in favour of the Bath water. The method of cooling them for the above purpose that I would propose, should be in full bottles, with a drop or two of sweet oil upon its surface instead of a cork.

the iron or some of the other calcareous principles. Therefore it is in-vain to impute any of the virtues of the waters to their fixed air; for while it is in the waters it acts as a neutral vitriolic salt only. Of this singular but scanty salt, the cross-bath water is supposed to contain most, and to retain the marks of it longest, while the hot bath water, on the contrary, gives the weakest signs of it.*

Some

* Fixed air bears a strong similitude to the spirit of sulphur in two respects, namely, in its elastic volatility, and in its very slight adhesion to all mild alkalies, iron and such other bodies as are more powerfully attracted by the mineral acids: and yet I cannot help thinking that it is the radical principle and primary cause of adhesive attraction in most bodies; and that in mineral waters, &c. it appears to us as only a superabundant principle, very slightly adhering to their other analysable ingredients, because these are already saturated with it as a principle of fixation. If this idea is just it rationally accounts for its being a strong antiseptic, powerfully counteracting any morbid tendency to a dissolution of the animal, either fluids or solids. But this very circumstance renders it strange (if it is true) that it should also act as a solvent of morbid concretions, such as calculi formed by its own fixing influence.

Some have suggested that fire ought to be considered as a constituent ingredient of the Bath waters. That it is an ingredient of them, there is no doubt; though I apprehend not exactly in the sense they mean. Their presumption proceeds from a mistaken idea in chemical philosophy, which has been adopted of late, and has been pretty much recurred to in accounting for some of the phenomena of that science.

Their notion is, that fire exists as a principle in some bodies more than in others, without any manifest sign of its so existing in them. Some have denominated fire in this supposed state, *latent heat*, a negative positive term, like the old inexplicable one *vis inertiae*: others have considered fire as a substance in some cases, fixable and capable of adhering to some bodies by some power like that which the chemists now distinguish by the name of *elective attraction*. I
have

have no doubt but that fire exists in all bodies, and that in very unsuspected states : I believe it is even so intimately incorporated with them, as in a manner to constitute the very essence of their different specific characters and qualities : but that fire can be really fixed in any body, seems to me impossible ; *motion being as essential to its state and character as fire, as materiality is to its local existence.**

All

* If light and fire are substantially the same, (and I must beg leave to say, that it favours more of sceptical cavilling, than of philosophical research, to doubt it) there is one circumstance relative to the mobility of this body that philosophers seem never to have duly attended to. According to their own observations and calculations, the motions of light are as instantaneously and rapidly projected by the slightest reflection, where no sensible heat is generated, as from the most vehement action of fire in the orb of the sun itself : it is even by the reflections of light from the satellites of the planets which have never been discovered to convey any sensible heat, that the velocity of the light from the sun to this earth is calculated.—This prodigy, as it may well be called, the astronomers think they have observed and ascertained ; but a solution of the my-

All that can be determined then, as to the quality of Bath waters from their analyfable ingredients, is, that they are moderate correctors of acidity; that they are ftill more moderately cooling on account of their neutral falts, and almoft imperceptibly bracing.

To

ftery they feem never to have thought of detecting or enquiring into. At any rate it feems palpably abfurd to talk of fixing by the weak remora of elective or any other known power of attraftion, a fubftance allowed to be constantly moving, and that too in all direftions with ten thoufand times, I may fay, the velocity of a ball out of the mouth of a cannon — But whenever fciencce degenerates into the hypothetic marvellous, it fets all confiftency at defiance.

The very ingenious Meftrs. Meyer and Beaumé feem to have penetrated, or to be penetrating into a juft train of reasoning towards the interpretation of the action of fire in other bodies, which the otherwife ingenious Monf. Macquer labours hard, but unfecefffully to refute. See additions to his dictionary of chemiftry under the article *caufticity*.

To refer the qualities of the waters to any inimitable mixture of these ingredients in them, I own I have no conception of that. I admit that nature has an inimitable power of variously mixing, transforming, and digesting the same materials taken in by different vegetables and animals for their nourishment; nay, of digesting and maturing them in mineral productions, or unorganised bodies also: but that nature has any inimitable mode of simply dissolving salts or earths in water, that are recoverable again from it in their native forms, is what I can scarcely reconcile my judgment or understanding to. Simple solution is a work of nature itself; but if there are any different inimitable modes of it, they are totally unknown to me.

I refer you to my next for my further thoughts on this subject, and am, &c.

L E T.

L E T T E R II.

I HOPE, sir, you do not suspect that from what I have said in my former, I mean to depreciate the virtues of the Bath waters, or lessen them in your esteem: it is certain they are endued with powers and qualities that the ingredients separable from them by art will by no means account for; it follows therefore, that these must be referred to some other causes either occult or manifest, unsearchable or searchable.

Besides their analysable ingredients the Bath waters discover in themselves two other sensible qualities, namely, *manifest heat*, and a *manifest sulphureous flavour*. It is natural, therefore, to enquire

quire how far these circumstances may contribute to the medicinal virtues of these waters.

That the heat of the waters have the same medical qualities with any other water heated to the same degrees, by whatever means, is, I suppose, what no one will or can doubt. These, with submission, I will venture to say, are of more general importance than is countenanced by the present practice of physic.

But it may be asked, is there nothing specific in the nature of the heat of the Bath waters? If I should answer in the affirmative, without explaining my ideas of that matter as distinctly as I can, I might, not unjustly, be charged with the same kind of absurdity as I censured in those, who supposed there may be different inimitable kinds of solutions of salts in water. Now, therefore, as I am
of

of opinion that the cause of the heat of the Bath waters is also the immediate and direct cause of their principal virtues. I will in the first place explain to you my conception of the manner in which they acquire their heat.

I cannot presume to differ from the common and general opinion of the manner and cause of the generation of heat among mineral mixtures ; which in all cases supposes sulphur and aqueous moisture, as two indispensable ingredients of such fermenting substances as produce it. Water indeed cannot be called a direct but only an intermediate cause in the production of such heat. *Sulphur* was for a long time used by the chemists as a general name, not only for the inflammable principle in bodies, but also for one of the elementary constituent principles of all bodies ; which term is now superseded by that of phlogiston : but I speak of common mineral sulphur,

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which, though a substance susceptible of inflammation of a certain kind and degree, is much more allied to acidity than to inflammability.*

* The ancients sometimes when they afford us no other documents of their knowledge of subjects, give us marks of the ideas they entertained of them by the names they gave them, or by the ceremonial uses to which they applied them. We have an example of both these in regard to sulphur, which was used by them in all their lustrations and purifications, and to which the Greeks very emphatically gave the name of *Θειον* expressing thereby, I fancy, something divine in its nature.—We know no substance perhaps in nature, none at least in the mineral world of such a mystic and complex character and use. It seems in one or other of its forms essential to the generation of all mineral productions; by different circumstances of digestion, it is susceptible of various and seemingly opposite characters. It is wholly inflammable and, by inflammation, it is almost wholly convertible into acidity: under the first it seems to contribute to the phlogistic character of all mineral substances, and under the second to their cohesion and density. The constituent parts of sulphur are uniform, and seemingly of this singular character, that they are susceptible of either a phlogistic or of an acid modification. By combustion in the open air sulphur passes through the one state into the other, being inverted into acidity in the very action and instant of inflammation. This species of inflama-

It is therefore intensely disposed to run into violent combination with all such other mineral substances as are destitute of manifest acidity. It proves perfectly corrosive and destructive of the adhesive texture of some of the substances it so attacks. This inherent power in sulphur of corroding or absorbing certain minerals, is always exerted by the intervention of aqueous humidity enabling it to unfold its latent acidity.

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bility, of which sulphur in its native state is susceptible, is known to the most vulgar observation to be very different in its appearance from every other species of inflammability. But chemists must know, that sulphur or its acid is susceptible of conversion into another species of inflammable or phlogistic substance, upon its mixture with iron, alkalies or quick lime. In the case of its mixture with iron, I am aware it may be alledged, that the phlogistic air generated may proceed wholly from the iron, which will not be so easily proved: but in the other case, as neither caustic alkalies nor quick lime are known to contain any phlogistic matter, the generation of it must proceed from the sulphur alone. I know that the inversion of salts and oils into one another is neither supposed, nor will readily be admitted into the present theory of physics, but there are strong indications,

There is no mineral substance known upon which sulphur, under such circumstances, acts more vehemently, and in so doing, generates more heat than upon iron and calcarous substances. The Bath waters contain evident, though slight, signs of both these principles concurring in the generation of their heat. But then these signs are so very slight, that it is absolutely impossible such a diminutive quantity of these materials as the waters exhibit signs of, should of themselves produce

that all the processes of nature amount to no more than a continual series of inversions and reinversions of forms into one another; nature disburſing from her treasury, and recollecting into it again the same materials after their paſſing through an innumerable ſeries of transmigrations; ſo that the moſt ſimple idea that the courſe of nature ſuggeſts to us is, that none of its principles or radical forms known to us are immutable under her influence, however ſome of them may appear ſo to us. The incomparable Becher may be conſulted on what he ſays relative to this ſubject, in his compariſon between the proceſſes of fermentation and combuſtion, in a ſmall treatiſe which he wrote, I believe, either when he was in Cornwall, or in the Iſle of Wight.

duce any sensible degree of warmth. They are only, they can be no more than, very slight abrasions or efflorescences brought from the fund of materials where the heat is generated and maintained.

I repute the story recorded of Mr. Rochas, if true, to be quite unintelligible, from want of circumstances necessary to support even the credibility of the fact. To me it seems exceedingly improbable that a stream of cold water, however small, should immediately on its entering a vein, we shall suppose of pyrites, have been found hot, unless the materials of which the vein was formed had been found much hotter than the water: for I dare venture to affirm, that no water, at least none whose analysis we are yet acquainted with, contains one twentieth part of the effervescent materials, that would be sufficient to render them the cause of its heat; nor can water instantaneously catch such heat, merely by

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gliding

gliding through veins of such fermentable materials.*

Hot mineral waters therefore must acquire their heat, either by being, for some considerable time, stagnant upon a fermenting bed of such materials; or within the reach of the hot fumes that such fermenting beds are constantly discharging into the waters in their stagnant state. The waters may bring the other ingredients of their composition from other parts of their subterraneous passage into this stagnant state: though it is not necessary to suppose that they must do so;

* Upon further examination into the fact, I am apt to suspect that some mistake must have happened to Dr. Oliver (or rather Dr. Peirce) in reporting Mons. Rochas observation. Junker in his *Conspectus Chimiæ*, in the article of *water* mentions the same M. Rochas, who says, he traced a mineral spring on the Alps, with circumstances similar to those related by Dr. Oliver: but Junker makes no mention of the water of the spring becoming hot at a particular spot of its under ground course, but only of its becoming there mineralised.

so : but it seems to me next to a certainty that they can only derive their symptoms of iron and sulphureous gas, perhaps also most of their calcareous earth, immediately from the place, whatever its extent may be, where their heat is generated and maintained.

It is more than probable then, that the hot springs of Bath are issued immediately from a subterraneous lake (of what dimensions or how far below ground it is impossible to determine) all, or part of whose base is in a state of mineral fermentation ; or is in communication with veins through which the hot fumes of such a fermentation adjacent to the lake discharge themselves into it. This lake cannot be supposed to be a small one ; when it is considered what a large stream is continually issuing from it by the three springs taken collectively : for it is with great probability presumed, that they have all one source ; and that any small

difference among them either as to heat, or their ingredients, is merely the different length of their various courses, or some such circumstance as may slightly affect them, between their departure from the reservoir and their breaking out above ground.

If it is objected, that it must require an intense degree of heat, even equal to that of actual fire, to heat so large a volume of stagnant water as I suppose the lake may be that feeds the springs. I grant that it would do so, if the surface of the water was exposed to the access of the atmospheric air: but even in that case, there is a wide difference between the quantity of heat necessary to warm, in any given degree, water that is cold, and that is necessary to keep up the heat that it has once acquired. For example, the small feeble flame of spirit of wine in a lamp, will keep a tea-kettle full of water boiling hot, though it would never
make

make the water boil if it was cold. But besides the exclusion of the common air from this lake of hot water, we must consider that the cavern which contains it possesses all the heat of the water itself; and a fluid will never cool while the vessel containing it is hot, and both are excluded from the reach of all impressions of atmospheric cold.

In my next, I shall proceed to give you my idea of the virtues which I apprehend, the waters derive from their impregnation by the heat, and am, &c.

L E T T E R III.

S I R,

IT becomes next our business to enquire what qualities and virtues the waters may rationally be supposed to contract from the manner of their being heated. My ideas of that matter I shall reduce to the two following points: first, the change produced on the waters themselves, or any moiety of them, by the fermentative action which gives them their heat: secondly, the impregnation not subject to analysis that they may derive from the direct cause of their warmth.

1. Water is the only terrestrial substance that can be accounted a simple element,

ent, whose constituent parts, so far as we can discern, are all homogenous; but then they are, in my opinion, so far from being immutable; that there are not wanting the strongest causes of presumption, that its particles are not only mutable in their structure, but that they are the digestible sperm of all other terrestrial substances. If water is the mutable subject of all other bodies, it can scarcely be supposed that under its immense variety of exposures, it will not be subject to various impressions, which may change its properties, though it still retain its character as water.*

This

* I know that the great Boerhaave, whose judgment I highly respect, is of opinion that the constituent particles of water are unalterable, but the soundest understandings are sometimes mistaken. I cannot help looking upon all the objections that I ever heard made to the famous Van Helmont's experiment in proof of water's being the direct material nutriment of vegetables, as frivolous and inconclusive.

This I need not enlarge upon as a rational induction, seeing it is well known as matter of fact, that in our atmosphere, water, in the different exposures of wells, fountains, rivers, ponds or lakes; ice, hail, snow, rain, &c. acquires different qualities, by the alteration that these different circumstances make, it is probable, upon its elementary constituent particles. Why then, may not the evaporable particles of water receive different specific characters or qualities from the different specific modes in which they are heated. For example, when oil of vitriol is mixed with water, an intense heat is generated, by the violent rapidity with which the aqueous particles are sucked into the salt, and when heated are repelled again, giving place to others, till the solution becomes uniform and complete. Can we avoid concluding in this case, that the water must acquire a particular quality from this mode of its being animated with heat? from obvious circumstances,

stances, I am persuaded it does, and I know not one reason sufficient to prove, or to render it even probable that it does not. Quick lime is diametrically opposite in its nature to oil of vitriol; water mixed with it produces as much heat as with the other: and the aqueous effluvia raised by these opposite mixtures have very different flavours—even gold itself, which yields to no solvent but one, quenched in water, is said to impart to it a particular flavour or taste.

Reason, therefore, obliges us to conclude, that when heat is generated in water by its own intervention or mixture with other cold substances, its particles must thereby undergo some physical change.

Upon the whole then, I think we shall be justified in making this deduction or corollary; That water digested *in occluso* in a heat generated by a mixture

ture of some of its own parts, with sulphureous and other principles, without the accession of any actual fire, is likely to acquire such a change of its constituent particles, or at least of some of them, as may in part enrich the water with those medical qualities the waters of Bath are found to possess.

2. As to the second point, namely, the unanalysable ingredients with which the water is impregnated. There is no manner of doubt, but that the Bath waters, along with their heat, acquire a specific, definable impregnation, though too subtle to be caught, to which I have no hesitation in ascribing their most eminent and powerful qualities.

Inflamable gas is plentifully generated in the resolution of pyritous substances, which is always attended with fermentative heat. Though it is of the nature of an highly inflamable oil, yet, in the form
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of vapour, it freely mixes with water; as perhaps any inflammable substance would do in the same divided state. It appears to me that Bath waters are no further either sulphurous or calybeate than they are impregnated by that pyritical ferment which supports their heat: I think I am justified, therefore, in concluding that they derive their heat and their characteristic qualities from the same immediate cause.

If the analyzing of waters means any thing, it ought to be in order to establish *a priori* their virtues, and consequently to determine the propriety, and the mode of using them. But sometimes, after the most laborious analyzes we are referred to something inimitable in the composition, and mixture of the ingredients in waters, as the source of their virtues, which are only discoverable by experience and matter of fact. I admit, that well attested facts, which I believe
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are as numerous in favour of the Bath waters as of any, are a very sufficient authority for recommending them: but, if after most accurate investigations, physicians, as well as the body of their patients, must refer the virtues of waters wholly to matter of fact, or something inimitable in their composition: then, such investigations are made to very little purpose: for in that case, it is not the ingredients in the waters which produce their virtues, but some inexplicable composition of them; some such thing as is produced by the secretion and digestion of fluids in the vessels of vegetables; which, out of the same nutritive materials, can produce either a lilly or a rose.

Acid gas, commonly called fixed air, has by no means, escaped the attention of medical people: which they may find as plentifully in brisk cider, or spruce beer as in a saline draught in the act of effervescence: but, inflamable gas has
not

not only escaped their attention, but whenever, without their intention, or permission, it has insinuated itself into their compositions, they have taken particular care to avoid it: as, in the washing of sal polychrest, and the almost total disuse of the balsam of sulphur; while the disgusting ingredient was in fact the most active and important one in the compositions.

This inflammable gas, called also *hepatic air*, which I shall call the *progeny of sulphur*, because, I do not think it can properly be accounted the inflammable part of it only; but rather, an inversion of its substance or corporeal particles into a volatile and more perfectly inflammable modification.* I have lately seen an

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account

* As in my idea of the nature and origin of bitumens, and other mineral combustibles, I may be deemed to differ from some very respectable names, and of great authority, I shall here assign my reasons for doing so. Maequer is inclined to refer all the bituminous class of substances to a

account of some experiments tending to confirm this idea of the matter.

This inflammable vapour, I consider as one of the most active, to be at the same time, to the sense, mild principles that can be employed in medicine: even sulphur in the form of flowers, which is not in quite so bad repute as this progeny of it is amongst physical folk, never exerts its efficacy

vegetable origin: Newman seems, though he does not speak decisively, to lean to the same opinion: Juncker, with more reason, in my judgment, objects to that idea, and rather chuses to refer all mineral inflamables to an original primordial stock of that specific substance lodged in the bowels of the earth. Stahl likewise, whose authority I should be proud of being supported by, objects to the idea of bitumens being a conversion out of sulphur.

My reasons for differing from such respectable authorities are, first, wherever bituminous substances abound, there is always to be found an intermixture of pyritous or sulphurous substances as of parts that had not been fully converted into the bituminous form: secondly, in the distillation of all bituminous substances, there is always produced a volatile acid, similar to ol. sulph. per camp. thirdly, in the decomposition of sulphur without inflaming

efficacy in the animal constitution, but in so far as it is subtilised into this volatile inflammable state; a state which the inflammation of sulphur in the open air cannot reduce any of its parts to, as is manifest from both the singular pungency of its smell, and the colour of its flame, when burning.

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it, there is always produced an inflammable gas, called phlogiston, which has all the characters of the inflammable part of bitumen reduced to vapour.

I think these considerations nearly amount to a proof, that sulphur, under certain circumstances, by the energy of its own phlogisticated character is convertible into bitumen: Upon the whole, therefore, I am for the above reasons, strongly inclined to conclude that beds of anthracaceous substances, such as coal, &c. have been originally beds of pyrites, digested by nature into their present inflammable character, and that all the bitumens, petroleous mineral pitches, and oils, are fermentative exsudations from such beds or veins of pyrites either transformed or transforming into the more inflammable state, forced or distilled from these beds by that internal self-generated heat among the materials that is accessory to the conversion of the sulphureous into the bituminous nature.

It is impossible to determine in what quantity the Bath waters are impregnated with this vapour: for while the flavour of it to the smell is, particularly to some people, very faint; the smoothness of the waters upon the palate seems to indicate the impregnation to be very considerable. I should be inclined to suppose that a great deal of that effluvia deposits much both of its volatility and of its olid character, by its detention and digestion among the waters in their subterraneous bed, without any possibility of its escaping from them, probably for a long time; if the reservoir or collection of the waters be large, as there is much reason to conjecture it is. We know, in fact, that similar inflamable vapour abounds much in many places when it betrays very faint tokens of its existence to the smell.

But in fact, while it is impossible to determine in what quantity this attenuated substance exists in the waters, we know

know for certain that its active power is very great in very small quantities : which several chemists have experienced in their laboratories to their no small danger.

The specific properties of this active principle are these : 1. It has all, and in some conditions even more than all, the volatility of any known either alkaline or acid spirit ; without, first, any of their irritating pungency, and secondly, without hazard of having its volatility suppressed or subdued in the constitution by saturation with opposite principles, as either acid or alkaline volatiles have ; these cannot go far in the animal circulation without encountering opposite principles in the constitution, which on combination with them, render them neuter and suppress their activity.

But with regard to this sulphureous principle, it is a point I cannot take upon me to determine, whether it can be animalized by the assimilating powers of the human frame, or not.

Now, *a medicine is no longer a medicine in our constitution than while it remains unassimilated thereby.* Whenever it is animalized it becomes part of ourselves, and so is divested of its medical quality. The more tenacious therefore any substance is of its own specific character, after being taken into our constitution, the longer and more powerfully it acts as a medicine. *This is the plain and obvious reason why mercury and antimony are such powerful medicines:* the vital principle in the animal constitution has not power sufficient to alter or assimilate these substances into its own nature; therefore they act with all their specific momentum and qualities while they remain in it.

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2. Further, another quality of this gas is that, as I have already hinted, it is so far from being irritating, that it is, on the contrary *anodyne*; nay, there is reason to suspect that if it was taken in an overdose, it would prove *narcotic*.

3. Again, it is wonderfully healing, in all cases of sores or solutions of continuity either external or internal: this is what convinces me of what I hinted before, that the Bath waters under proper management might be rendered a useful medicine in consumptive cases. Of sulphur and its progeny, I dare be bold to affirm, that we know no other medicine of such healing virtue and efficacy.

When the qualities of medicinal waters are once precisely known, or can from circumstances be shrewdly guessed at; the extent of their utility, the ratio of their effects, the cases to which they are adapted, and the method of directing

and regulating the use of them, becomes known of course. Upon the whole, thus much in general may be said of the virtues of the Bath waters, that they give additional warmth and vigour to the circulation; they expand and enrich the fluids; they soothe any irritability of the system, and in some degree prove intoxicating and narcotic; they plump the parts, soften the skin, and promote perspiration; they tend to heal and dry up all sores internal or external; and they sweeten the blood, sheathing and correcting any acrimony therein.

After having communicated to you my idea of the specific qualities of the Bath waters; the information you wanted does not, I apprehend, require that I should enter into any detail of the various maladies to which the internal use of them is adapted: from their leading characters that may be determined *a priori*, without

out appealing to the numberless cures performed by them.

It may be of some consequence however, to persons coming or sent to Bath for the use of the waters, to mention, first negatively, that they will by no means agree with persons of a full habit, or labouring under any disease that arises therefrom, unless the waters themselves either prove laxative, or such habits are first properly reduced by a cooling and light regimen, both as to the quality and quantity of their diet, which ought also to be strictly adhered to during their use of the waters. I have known several instances of persons who have resorted to Bath for complaints arising solely from plethora and a too vigorous circulation; with such the waters constantly disagreed. This is the more necessary to be attended to, because frequently the same morbid sensations, especially in the stomach, are felt and complained of by persons of opposite constitutions, and in fact,

fact, are excited by opposite causes. Secondly, it may be adopted as an aphorism or maxim in regard to the safe and advantageous use of these waters, that the lower and cooler ones diet is, in so much the larger quantity they may be used with safety and benefit; and I am persuaded that where important benefit is wished or expected to be obtained from them, they ought to be drunk in much larger quantity than is at present the fashion to use them in.

As to the external use of the waters; the benefits of ordinary warm bathing itself are so extensive and various, that it is a problem of no easy discussion to determine all the variety of cases in which the external use of the Bath waters is expedient and salutary.

The use of the thermometer is now so familiar at Bath, that the very guides are learned upon that subject: but after all,

all, every ones own feeling is the most certain directory in that respect. There is a considerable difference among constitutions and textures of skins as to the degrees of heat at which they feel positive warmth; what may be only a tepid bath to one, may be a positively warm bath to another. The most useful application of the thermometer would be to the ascertaining according to every ones own feeling, the degrees of heat between tepidity, or the same degree of heat with their skin, and the greatest degree of heat that such skin can bear: then the intentions of a *tepid bath*, a *warm bath*, or a *very warm bath*, might be precisely adjusted: but I look upon the thermometer as a superfluous nicety where sensation is concerned. A *tepid bath* is most suitable for persons of firm and tolerably sound constitutions; it is least disturbing to the natural state of the circulation, and most antispasmodic. A *warm bath*, which ought to be sensibly hotter than the skin,

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is most favourable for absorption ; it also dilates the fluids, and of consequence expands the vessels, especially the subcutaneous ones, it also enlarges the pulse and somewhat quickens it. A *very warm bath*, that is such a degree of heat as a person can bear and no more, besides the effect of a warm bath, brings a degree of redness or slight superficial inflammation upon the skin, and therefore is most calculated for present and speedy relief in all internal aches and pains ; whether gnawing or more sharp and acute ; which relief ought to be seconded by judicious management afterwards : but to answer any of these purposes, some attention must be paid to the time of continuance in the bath.

Here I shall close my correspondence with you on the subject of Bath waters, and am, &c.

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A D V E R T I S E M E N T.

THE original draught of the subsequent paper was projected for the public service in a different form. It had often been suggested to my mind, that it would be an act of humanity and benevolence, and prove of some real benefit and advantage to the public, to publish, and periodically to republish in the news-papers in general, a few monitory cautions and directions relative to such epidemics as are annually more or less recurrent, at particular seasons. Many such complaints,
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by no means dangerous in their own nature, often prove not only dangerous, but fatal among the people at large, merely from their want of the knowledge of some few very simple means both of alleviating and of preventing such disorders, at little or no expence.—I do not mean in order to make the people doctors, but to teach them when they are necessary, and when in not a few simple and easy cases, they may do without them. People have no conception how many painful and dangerous disorders may be either relieved or avoided by very slight attention to themselves in proper time.

Full of this idea, and as a specimen of such a plan, I sent to the editors of the *Bath Journal*, some short remarks and directions

directions relative to autumnal disorders of the bowels, which they were so good as to publish in their paper of the 3d of September last, and which were intended to be succeeded by something upon the same plan, on autumnal and other plain fevers. But the misfortune is, that things so communicated to the public (unless they are repeatedly inculcated at the proper seasons, and people are readmonished to be upon their guard) for once only, whatever their consequence and importance may be, are, if at all attended to, soon forgotten and lost. I thought therefore, if there was any thing useful, or worthy of attention in the following practical remarks on plain fevers (which are now indeed enlarged with some physiological views on the subject) they had a better chance

chance of being attended to, by being annexed to the preceding *idea of the nature of the Bath waters*. For, as I have said, any subject treated of in a newspaper, has little chance of being duly attended to, unless some plan was established for the periodical repetition of it. Health is a valuable thing; but people are apt to treat it as they do their duty, and supinely forget the most obvious and easily avoided dangers, unless they are repeatedly put upon their guard.

REFLECTIONS

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F E V E R S.

SECTION I.

THAT medicine, like all other professions, is obnoxious to error and abuse cannot be doubted. I do not know a more material injury the public have at any time suffered from any of the dogmata in medicine, than what it has felt by the introduction of the term *putrid*,

(in the recent sense of that phrase) as a too common and general denomination of plain fevers.

The bulk of mankind, especially the young and those of full habits, have a natural dread of fevers, which it is exceedingly inhuman to inflame, as the addition of the term *putrid* to *fever* does, even to the degree of absolute terror; by people annexing the idea of *infection* also to *putridity*. When fevers are prevalent, nothing is heard of in the country, and amongst unskilful practitioners but *putrid* fevers: and to be sure it is a very convenient idea for them to propagate; for as the term is now understood to imply the most fatal species of fever, it answers the two-edged purpose of an apology for bad success, and of magnifying their skill when their patients happen to recover.

I am surprized that it has not long before now occurred to some gentleman of
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confessed knowledge and authority in the profession, to stem that torrent of abuse, and alleviate the influence of its cruel impression on the minds of the public; which not only drives apprehensive people from every part of the country, where the most common fever happens to be epidemic, but terrifies them from fulfilling, but with dread and terror sufficient to produce a bad fever, the offices of humanity due to their sick relations and most intimate friends.

The subject has often occurred to me, and would have been attempted long ago, but for the apprehension of being insensibly led thereby more deeply into the consideration of the nature of fevers, than my late or present degree of application would be sufficient to accomplish. Humanity will however, I hope, apologize for my attempting to offer some loose hints, for the relief of the minds of my fellow-creatures upon this subject, without

without that extension and regularity that might entitle them to the name of an essay. If any practitioners can derive any assistance or improvement from them also; so much the better.

1st. The first observation I make, for the benefit of general information, is, that formerly, when the science of medicine was taught and studied in a more regular and scientific manner than, in my apprehension it has been of late, in this country at least; the term *putrid*, as applied to fevers, had a very different signification and meaning from that affixed to it within these few years. Then, a putrid fever meant no more than any, or every fever in which there was a concoction and critical discharge of the morbid matter in order to the cure or extinction of the fever. The change of the morbid matter that qualified it for being discharged by the different emunctories of the body, they considered as
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putrefaction, just as we do *pus*, or the suppurated matter in an imposthume.

It is not my business here to ascertain the propriety or impropriety of these ideas, but only to state them: from what I have said, the reader will observe, that the old notion of a *putrid fever*, had nothing shocking in it; but in the present day that sense of a *putrid fever* is suppressed and forgotten. I am not certain whether the very idea of the necessity or reality of concoction and crisis in fevers is not treated as hypothetical by some of great name in the medical line. The term *putrid* is indeed retained, but it has totally changed its signification and meaning into that of a fever of the most malignant and infectious kind;—a fever that is rarely to be met with, except in crowded ships, hospitals and jails; and even then ought only to be called putrescent, or apt to degenerate into putridity.

2dly. My second general observation is, that no fever of which the sick recover, ought to be called *putrid*:—for, wherever a fever either actually commences with the putridity of the fluids, or in its course degenerates into that state, it is impossible the patient can recover.

3dly. Every fever, of whatever kind it is, becomes *putrid* before it becomes mortal. Whenever the progressive motion of the blood, and the powers of the circulation are so oppressed by any fever, that they can no longer resist a tendency to fall into intestine fermentation; then putrefaction begins. So that if putrefaction is made a scare-crow to frighten and alarm people, they should also with equal reason be urged to fly from all fevers, and indeed all mortal diseases and dead bodies. I have seen a person in an ordinary dropsy more *putrid* before death, than ever I saw a person in any fever,

fever, except one, and that was in a miliary, not a petechial fever. But

4thly. *Putrefaction* and *infection* are quite different things. They have so little certain connection with one another, that it is really questionable whether proper putrid effluvia are at all the immediate vehicle of infection. We know in the cases of the small pox, the venereal disease, the itch, the leprosy, &c. that it is not *putrid* effluvia, but effluvia of a different concoction, generated by these specific diseases, that convey infection.

5thly. When fevers or other diseases are epidemic at any particular season, it is very common to confound *infectious* and *epidemic* with one another. For example, when the dysentery or bloody-flux, which is generally an autumnal epidemic, is common, how is it possible to determine that it is infectious, as it is generally reputed to be. For when a
disease

disease is epidemic, how can it possibly be ascertained that any one catches it by infection? In a season when fevers were epidemic, I have known divers persons of the same family, though above twenty miles distant from each other, seized with the same fever nearly about the same time. Probably if they had been at home, it would have been concluded they had caught it by infection one from another.

Upon the whole, no prudent and cautious physician will rashly pronounce any epidemic fever to be a *putrid* one in the modern usage of that term. Indeed I am of opinion, that out of regard to the ease and quiet of the minds of the public, no fever should be pronounced *putrid* and *infectious*, which is the same as calling it pestilential, without the sanction of a consultation of judicious physicians. Lest therefore, under the ambiguity of the term, practitioners who are fond of the word

word *putridity*, should still use it when speaking of fevers under their care, they ought to be desired to explain themselves, and tell in which of its senses they use it.

SECTION II.

THE remote inherent cause of fevers, is a subject of some obscurity, and has been but obscurely treated of by the great variety of authors who have handled it. The cause of the worst kinds of fevers both continued and intermittent, has been generally referred to some excess or depravity of the fluids, most generally of the bile; but I am not certain whether that ought not rather to be accounted an effect, than a cause of the disease. Some symptoms are so early and in a manner coeval with the disease, that it is not at all wonderful to find them
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fixed upon as the causes of it. I am of opinion, that the most obvious and direct predisposing cause of all fevers, ought to be attributed to a *morbid state of the skin*; particularly, to a decay or deficiency of the circulation of the red blood, in its finer vessels to which it ordinarily extends in a state of health.

It is generally allowed that a certain degree of rigour or coldness is the immediate prelude to all fevers. As the red blood is the origin, seat and elaboratory of animal heat, a deficiency in the extent of its circulation along the vessels of the skin, of course produces a sensation of coldness.

Whether the skin has ever been considered as such or not, *it certainly is as much a vital organ as any of the internal viscera* that are accounted such. Nay more, it is not only of equal importance with any of these in respect
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of its proper or *private function*, but it is the *regulator* of the integrity of the action of all the internal viscera; being the periphery or boundary of our system, its reaction is the equilibrium which regulates the circulation and functions of all the internal parts: therefore a decay of the vital warmth and energy of the skin, induces an oppressive momentum or load of the circulation of the red blood upon the internal parts in general: hence that sense of heaviness, dull pain, internal heat and thirst, which generally commences with the rigour of a fever or the cold fit of an intermittent.

The sentient solids of the skin in the degree in which they are deserted by the warmth of the red blood,* fall into that vacillatory tremor which mechanically tends to rouse again and revive the languishing

* In my *medical researches*, I have offered some considerations to prove, that the red blood is the elaboratory and fountain of animal heat.

guishing circulation in the skin: in this they are assisted by that perception of coldness annexed to this state of the sentient fibres, which makes their tremor feel as if it was a faint effort of the will to recal warmth. In fact as that is the design of nature in exciting the tremor; that end is produced: for then the hot fit, or what is properly called the fever, commences. But as there is a mechanical antagonism in all the operations of nature, and as in every case re-action proves equal to action, so in the same degree that the languor and coldness prevailed, and according to the difficulty with which it was overcome, with the like accelerated intenseness does the red blood rebound beyond the ordinary limits of its circulation: for with strictness of propriety a fever may be defined a general *error loci*, or *propulsion of the red blood into that series of vessels which do not admit it in health.*

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This I take to be a fair and plain definition of the animal mechanism of a fever, without having recourse to spasm or stimulus, or any more unintelligible causes. The heat of the blood, scorching regions of the constitution which it does not occupy in health, will account for all the symptoms of stimuli and spasms discernible in fevers.

It is very certain that both the height and duration of fevers are proportioned to the degree and continuance of the cold fit or rigour that excites them. If that is short and severe, like the trembling fit of an intermittent, the fever that succeeds it, may be expected to be high and rapid in its course : if on the contrary, it is obscure and languid, with a kind of lassitude hanging about one for some time, the fever will be of a proportionably low and tedious type. Fevers seem likewise to derive much of their type from the particular internal part or parts which become

come first or most oppressed by the circulation on its retiring from the surface. Thus in the case of a pleurisy, or peripneumony, it seems to fall principally upon the pleura or lungs, and in all acute rheumatisms upon the ligaments and tendinous extremities of the muscles. I have sometimes been inclined to think that the cause of what were formerly called low nervous fevers, (which are little heard of now, since the term putridity became so fashionable) might be owing to the bias of the internal circulation falling in such cases upon the coats of the nerves, especially near their origin, and so greatly oppressing their action: it is very certain that in the beginning of some of these fevers the medulla spinalis seems greatly affected along its whole course.

S E C T.

SECTION III.

A Plain fever is one that is attended with no acute pain or local inflammation. Such generally are the epidemics which prevail from the height of summer to the end of winter, and indeed I may say, through the whole year; since from a general change in people's constitutions, febrile inflammations, such as pleurifies, &c. have become less frequent. Plain fevers ought only to be distinguished by the shortness or length of their course and period.

We have few examples of such rapid fevers now as terminate in three days. Ardent or seven day fevers are somewhat more common; but even they are not generally epidemic, being commonly excited by some accidental cause, or error in regimen

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that the patient has been exposed to. Nine or eleven days fevers are exceedingly common, and at the same time, the most mild and tractable of any species of fevers, if they are not perverted in their course by indiscreet or injudicious management. The most tedious plain fevers that we are acquainted with are such as hold out to the fourteenth or fifteenth day. When fevers seem to exceed that period, they ought rather to be accounted relapses, owing to an imperfect or disturbed crisis at that time.

The shorter a fever is, the more distinct and perceptible is its crisis. In long fevers, on the contrary, the signs of a crisis are frequently very imperceptible, and the beginning of its decline undiscernible for several days.

Every fever consists of, or is divisible into, three distinguishable parts. 1. Its *augment*, or the period during which the heat,

heat, sickness, thirst, &c. daily increases, till it rises to a certain pitch. 2. Its *state*, when that pitch to which the fever has arisen, becomes stationary, neither increasing nor abating for some time, proportioned to the quickness or slowness of its augment. 3. Its *crisis and decline*, in which it begins to throw off by perspiration, urine, or &c. some of the concocted matter or fluids (which is the reason, as I explained above, why all continued fevers were formerly called putrid ones) and gradually to abate in its symptoms. So that the whole course of a fever may justly be compared to a land-flood, which gradually swells to a height, continues at that swell for some time and then gradually subsides. In short, one fit (or paroxysm, as the learned call it) of a regular intermittent, is an exact representation of all that is transacted during the course of the longest fever. It therefore argues but very little, either scientific knowledge, or practical

observation, to say, that a fever may be safely suppressed or subdued in any stage of its course. There are I believe such medicines (or rather poisons) as are able to produce that delusive but fatal effect : happily however they are known but to few.

The crisis of a fever may sometimes with greater safety and success, be anticipated by forcing a critical discharge ; but it requires much caution and judgment to discern, from the state of the disease, and the strength of the patient, when that is safe : because when it fails, matters are in a hazard of being rendered worse. Therefore it is the wisest and safest course to moderate and regulate the height of a fever, by a more temperate use of those medicines, by which in larger doses a crisis is sometimes accelerated. The reader will probably apprehend (and indeed he will not be mistaken) that in what I have said, I have an eye to Dr, James's

James's powder. I cannot deny my suffrage to its being a valuable and efficacious medicine. I know very well that, upon the same principles, a very great variety of medicines of similar qualities may be composed: but I can see no necessity for altering the form of a medicine, whose character and doses are sufficiently known and established. I own, I have seen it shamefully and fatally misapplied; but that must be charged to the account of the administrator, and not of the medicine. When given and repeated in such doses as are just sufficient to produce and keep up a softness or gentle dampness upon the skin, it will scarcely fail of keeping any ordinary fever within the bounds of safety.

In proof and illustration of the necessity of a crisis in all continued fevers, I will only add: if we reflect that when in health, nature is constantly throwing off by some evacuation, such parts of the

blood as by their continuance in the heat and circulation thereof, are exhausted of their animal properties and forms: how much more must the heat of a fever reduce a far larger proportion of the fluids into that exhausted state, which becomes a load upon the remaining vital motions, and would suppress them if they were not expelled.

I have distinguished plain fevers by their periods into three kinds, first, the ardent, or seven day fever. This fever will bear plentiful bleeding, if it is early performed, that is before it has arrived at its height; for this ought to be carefully attended to and remembered, that no fever whether short or long can be benefited by bleeding, and may suffer damage by it, after it has attained that stage of its course. In other respects, that fever ought to be treated wholly with cooling internal medicines, gentle laxatives, cooling poultices to the extremities, and

and tepid bathing of the feet and legs, in order to solicit as much as possible, the momentum or weight of the fever from the head. In all such fevers, blistering is not only useless but mischievous.

Fevers that left to nature have their crisis in nine and eleven days, are generally the mildest, least dangerous, and, I am apt to think, the most common of all epidemic fevers, if they are not irritated by indiscreet blisterings, wine, and other hot medicines. I think I have had strong evidences in support of this opinion, having oftener than once in different seasons, seen between thirty and forty persons successively in the fever I speak of, without almost an untoward symptom amongst them, while at the same time, many fevers that were treated with that hot and irritating regimen, were reputed malignant, and proved fatal. This fever will bear bleeding in its first stage,

as I have said above ; but even that is not always, nay, I think, not generally absolutely necessary ; its symptoms being rarely violent or alarming in any respect. The only troublesome symptom I have found attending it, is sometimes an intense head-ach, and at other times, an obstinate watchfulness, or inability to sleep ; the former generally receives great relief from the application to the forehead and temples of cloths wetted with a cephalic lotion, composed of two parts rose water, one part spirit of vinegar, with a small proportion of Hungary water ; at the same time applying poultices to the feet, which ought to be renewed every night, and removed in the morning, washing the feet then with warm milk and water, and wrapping them up in flannel : the latter symptom is generally relieved by adding a few, that is, four or five drops of laudanum in every saline draught, which is generally repeated once in five or six hours, until rest is procured.

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The fevers that run out to the fifteenth day are naturally attended with more danger, and require more medicines, and other cordials proper to support the powers of life in overcoming the disease : but if the disease has been duly attended to from its beginning, even these are rarely necessary, till the fever is in its *state*, or advancing in its second stage ; and so far as I can trust observation, I am apt to think that *camphire*, and a pretty liberal use of wine, will abundantly answer the purpose. The singular excellence of camphire beyond any of either the aromatic or acrid medicines, lies in its being stimulating and penetrating, without heating in the manner that the others do. There are a few other medicines which I apprehend have some title to correspondence with it in that singular quality, and I am surprized that in that light, they have escaped the attention of all the compilers of materia medica's and pharmacopeia's I
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am acquainted with. I shall mention three of them, in order to recommend them to the examination and trial of physicians. The *agnus castus*, the *pyrethrum*, and the *peppermint*: the last we are pretty certain may be used with safety and advantage, in pretty large and repeated doses. Qu. Was it not expressly on account of this singular and important quality, that the *agnus castus* and camphire, nay even the *mentha vulgaris arida*, were formerly classed among the principal anti-aphrodisiacs, while the *mentha vulgaris viridis*, was, with some justice, reputed to be of a contrary quality?

In justice to Dr. Miller's vindication of the safety and importance of the use of the *bark* in continued fevers, I must say, that when seasonably applied, I think it of very great service. I never gave it before a fever was in its second stage, or arrived at its height, and when I thought the state of the patient very precarious, then indeed,

I have caused it to be administered very liberally, and with great success, so far as I have a right to judge of the efficacy of a medicine, by the recovery of persons in seemingly most dangerous situations, who took it—in conjunction, indeed I must add, with a pretty plentiful use of wine.

I shall finish what I have to say upon plain fevers, with some general remarks or admonitions, which may be of greater use to the ordinary reader, for whom my hints are principally intended, than any particular practical discussions intelligible to professional readers only.

1. In regard to diet ; it is very common for people to be anxious about the diet of the sick, and indiscreet in giving it them ; apprehending they will grow faint for want of food, and that it is necessary in order to enable nature to support the disease. This is a common mistake, for in sickness food is rarely necessary, while
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the sick person has rather a loathing of it, than a craving for it. There are few drinks given to sick persons that are not sufficient food for them likewise: one of the most nourishing potables, and at the same time abundantly light, is weak white wine whey, gently acidulated with orange or lemon; I cannot say that I am fond of animal drinks, though a little beef tea, or chicken water, especially if they are decocted a little with a good quantity of parsley may be safe. As for any other more consistent nourishment, it ought not to exceed stewed fruits, such as prunes, apples, or pears, water pap, boiled barley or rice; but these last should be administered in small quantities at one time.

2. Another mistake among people, which is pretty common, is, that there is no occasion to be anxious about procuring passages by stool, to persons in fevers; because, say they, as they eat none,

none, there can be no recrements of food to be discharged: but therein they are greatly mistaken, not knowing what a large proportion the humours collected from the glands of the intestines form of that excretion; nor how much it contributes towards allaying the internal heat, to have it from time to time regularly discharged, and to prevent its reabsorption into the blood as much as possible: because from the heat of the fever it acquires an additional fetidity and noxiousness; therefore, when nature is deficient in that respect, it is always safe and adviseable to assist her once in two days at least, by a laxative clyster, administering on the intermediate evenings an emollient anodyne clyster; to be retained, which contributes greatly to the coolness and quietness of the patient. This exception however must be attended to; not to be solicitous about procuring stools when there is any appearance of a critical eruption. A natural looseness

ness is never to be discouraged, as long as the stools are excrementitious, or charged with black bilious stuff; but when they are watery and excessively liquid, all possible means should be used to check them, for they drain the blood of its fluid parts, render the skin parched and dry, and bring the patient into the utmost hazard.

3. There is nothing that mankind in general need to be more fully apprized of, than the importance and necessity of attending to the first invasions of fevers: that is, the very first and slightest symptoms of unusual chilliness, listlessness, lassitude, and obtuse pains about the back and loins. It is impossible to conceive how many fevers may be entirely prevented, and how many may be alleviated in their symptoms and danger by such an early attention; which requires no further management than restoring warmth, keeping the bed, promoting a free

free perspiration, a light diet for some time, and afterwards using some gentle laxatives. I am fully persuaded that ten fevers prove dangerous and fatal, from a neglect of them in their first stage, to one that proves so from any original putridity or malignity in its nature.*

It happens sometimes, more especially to people of pretty firm and robust constitutions, and who are unaccustomed to sickness, that they go about with a fever upon them for more than half its course, without perceiving any signs of its existence, but those of its first invasion above-mentioned, or a sense of confusion, feebleness, and thirst. I would wish every reader to observe, that in my experience (I do not know how it may have happened to others) I scarcely ever knew a person in these circumstances recover. Exertion of every kind tends to exasperate the disease, and render its violence invincible.

* See, advice to the military, &c.

4. It is a caution of no small importance in all fevers, especially in tedious ones, to pay a particular attention to the keeping of the mouth clean, which is the business of the nurse, or the person who attends the sick, but in general is too negligently executed. It is not the making a fashion of doing it once or twice a day that will be at all sufficient; the mouth and lips are often neglected in a shameful degree, which increases the anxiety and stupidity of the sick, and renders them insensible of their own thirst; that salutary symptom which nature has provided to excite in them a demand for diluting drinks, the most indispensable medicine and cordial in all fevers.

Nor is it of small consequence to pay a strict attention to the posture of the sick, keeping the head always duly elevated, and the body always, if possible, in a lateral posture. I know not a more danger-

dangerous symptom in fevers than the patient lying always supine.

I shall close my observations with the following cautions relative to bleeding and blistering. 1. Bleeding ought never to be attempted when a fever has arrived at its full height. After that period it can have no effect in lowering the fever, and it may weaken the remaining powers of life which are combating it. 2. Blisters ought never to be employed till poultices, sinapisms, and these combined, be repeatedly applied to the extremities, and every other possible method of revulsion used to prevent or suppress a delirium or stupor. I would not be understood to condemn the use of blisters in the cases of local pain: then indeed they are highly useful, applied, as in the pleurisy, to the seat of the apprehended inflammation, or as near it as possible.

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Some practitioners seem to make blisters a catholicon for every kind of fever without distinction, and to think their practice not sufficiently justified, unless the poor patient is half excoriated before he dies. Of all topical stimulants, Spanish flies are the most futile, and slow in their operation; where such medicines are necessary, to support the progressive motion of the fluids, and the action of the solids upon them; mustard, euphorbium, and twenty other simples, seem vastly preferable to the cantharides; except for the shocking purpose of producing a stranguary.

This subject leads me to suggest a hint to practitioners, relative to many torpid diseases, such as apoplexies, lethargies, incipient palsies, and various spasmodic affections, wherein oppressed nature demands not flow, but if possible, immediate relief. Would not an extemporaneous inflammation, produced by the momentary

mentary topical application of a cloth or sponge, impregnated with scalding water, operate most instantaneously in such cases, both as a revulsion, and as a rousing shock to the system?

I shall just subjoin the two following short cases, as specimens of the quick and unexpected relief that may sometimes be suddenly produced in fevers, by revulsion. A country apothecary, who at the time was a little tipsy, applied large poultices (which I had ordered to a gentleman's feet in a severe fever) scalding hot. When I returned two days after, (for it was at a considerable distance from me) to visit the patient, the fever was gone ; but such an inflammation and pain was brought upon his feet, as disabled him from walking for almost a month afterwards.

The other case was, that of a robust vigorous young man, in the prime of
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life,

life, in so high a fever and delirium, that it required two persons to keep him in bed. He was servant to a gentleman of learning, and excellent understanding, with a good deal of the theoretic knowledge of medicine. As there was nobody to censure our practice, we agreed to put the patient into a femicupium, or half warm bath, and before he came out of it, to pour a tea-kettle full of cold spring water upon his head, which was done, and the consequence was, that he was no sooner put to bed, than he fell into a calm and sound sleep, in which he continued for six or eight hours, and awoke as free of fever, as if he had obtained a distinct crisis in the natural way.

P O S T S C R I P T.

IT has occurred to me, since closing the above little tract, that the yellow fever of the West-Indies, and indeed all the fevers Europeans are incident to, upon migrating into tropical latitudes, are an obvious demonstration of my sentiments, both in respect to there being no essential connection between what are called putrid fevers and infection; and also in respect of all fevers, especially remittent and intermittent ones, being originally diseases of the skin. I never heard that the yellow fever was reputed infectious; though it is one that better deserves

deserves the name of putrid or malignant, than any fever commonly so called in this country.

The plain reason why people of colder climates are so subject to these fevers, upon their passing into a hot one, is, the uncommon exhaustion that their skin is subject to, by reason of the constant profuse perspiration, by which the exhaling pores thereof seem to lose their elasticity and re-action, and allow the red blood in the finest vessels thereof to dissolve wholly, in a manner, into perspirable lymph.—If I guess right, they who upon change of climate are very difficult to sweat, will be even sooner obnoxious to fevers, than they who sweat too much: but then their fevers will be of a higher and more ardent kind, and less disposed to remit—but as in this I only write upon conjecture, I say no more.—It is very remarkable also, and no small confirmation of my

my opinion, that the course which nature generally takes to obviate and prevent these acute diseases, which change of climate is so apt to produce, is by supporting the extension of the circulation of the red blood so far along the finer vessels of the skin, as to produce salutary, critical cutaneous eruptions of various kinds and in various degrees, according to the temperatures of different persons.

F I N I S.

N. B. The author intended to have added to this publication, a short essay on the advantages that would arise from a more general use of the epistolary mode of consulting physicians ; but being prevented he postpones it till some future opportunity.

LIST of PUBLICATIONS

By the same **AUTHOR.**

M E D I C A L.

1. Essay on the Autumnal Dysentery. 1759.
2. Remarks on Autumnal Disorders of the Bowels,
Bile, and Spasms. 1765.
3. Review of Mr. Foot's Appeal, in a Letter to
Mr. Smith, Surgeon. 1769.
4. Enquiry into the moving Powers employed in
the Circulation of the Blood. 1774.
5. Medical Researches, &c. 1776.
6. Rational Advice to the Military, &c. 1780.
7. Aphorisms on the Constitution and Diseases of
Children. 1782.

List of Publications by the same Author.

PHILOSOPHICAL.

1. Thesis de Luce. 1749. Republished in the Edinburgh Collection.
2. Principles of Natural Philosophy. 1754.
3. Observations on the Principles and moving Powers assumed by the present Philosophy. 1764.
4. The Principles of analysing Waters by Drs. Wilson and Hall. 1770.

PHYSICOTHEOLOGICAL.

1. Creation the Ground-Work of Revelation, Revelation the Language of Nature. 1750.
2. Human Nature surveyed, 1. by Philosophy, 2. by Revelation. 1758.
3. Defence of 1st Section of Observations on the Principles, &c. in a Letter to a Lady. 1764.
4. Reflections on the Subjects in Dispute between the Author of the Divine Legation of Moses demonstrated, (Bp. Warburton) and a late Professor at Oxford, (Bp. Lowth)